ANNUAL REPORT FOR 2009

Campbell Creek Phase I Mitigation Site
Beaufort County
TIP No. R-2510WM

Natural Environment Unit & Roadside Environmental Unit
North Carolina Department of Transportation
December 2009

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SUMMARY

The following report summarizes the monitoring activities that have occurred in 2009 at the Campbell Creek Phase I Mitigation Site. The Phase I property was constructed in 2006 to provide compensatory mitigation to offset impacts for Tetterton Road (SR 1963). The 2009-year represents the fourth year of hydrology and vegetation monitoring following construction for the Phase I property. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful. The project site is located approximately seven miles east of Aurora in Beaufort County.

The site must be monitored for five years following site construction or until success criteria are met. The success of the marsh vegetation component of the wetland site will be determined in accordance with National Marine Fisheries Service guidelines. The site is monitored with thirty vegetation plots and five surface water monitoring gauges. Data analysis includes an examination of all recorded site data as well as an assessment of local climate conditions throughout the growing season.

In July 2006, five surface water gauges were installed to monitor hydrology on the Phase I property. Four surface gauges were positioned in the restoration portion of the mitigation site. One surface gauge was installed as a reference gauge within the preservation area.

Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate frequent periods of inundation. The surface water gauges will then be compared to the reference gauge to show that the inundation patterns are similar. The 2009-year represents the fourth year of hydrologic monitoring for the Campbell Creek Phase I mitigation site. The four surface water gauges were compared to the one reference gauge. The surface water monitoring gauges showed periods of inundation similar to that of the reference gauge during the 2009 monitoring year.

For the vegetation monitoring in the marsh grass area of the Campbell Creek Phase I property, the target species and scale values were 97.0% and 4.8, respectively. The property was planted in June 2006. The planted vegetation is surviving and spreading throughout the property.

Based on the results from the fourth year of monitoring of the Campbell Creek Phase I Mitigation Site, NCDOT will continue to monitor vegetation and hydrology in 2010.

1.0 INTRODUCTION

1.1 Project Description

The Campbell Creek site was constructed to provide compensatory mitigation to offset impacts for Tetterton Road (SR 1963). The project site is located approximately seven miles east of Aurora in Beaufort County. The Phase I site is adjacent to Campbell Creek and is approximately 29 acres in size.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Vegetation success criteria are based on the National Marine Fisheries Service guidelines. Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate frequent periods of inundation. The surface water gauges will then be compared to the reference gauge to show that the inundation patterns are similar. Included in this report are analyses of hydrologic and vegetation-monitoring results, discussions of local climate conditions throughout the growing season and site photographs.

1.3 Project History

April 2006	Phase I Site Constructed
June 2006	Phase I Site Planted
July 2006	Phase I Monitoring Gauges Installed
July-November 2006	Hydrologic Monitoring (Year 1) - Phase I Site
August 2006	Marsh Vegetation Monitoring (Year 1) – Phase I Site
May 2007	Phase I Site Supplementally Planted
February-December 2007	Hydrologic Monitoring (Year 2) - Phase I Site
July 2007	Marsh Vegetation Monitoring (Year 2) – Phase I Site
August 2008	Marsh Vegetation Monitoring (Year 3) – Phase I Site
February-December 2008	Hydrologic Monitoring (Year 3) - Phase I Site
August 2009	Marsh Vegetation Monitoring (Year 4) - Phase I Site
February-December 2009	Hydrologic Monitoring (Year 4) - Phase I Site

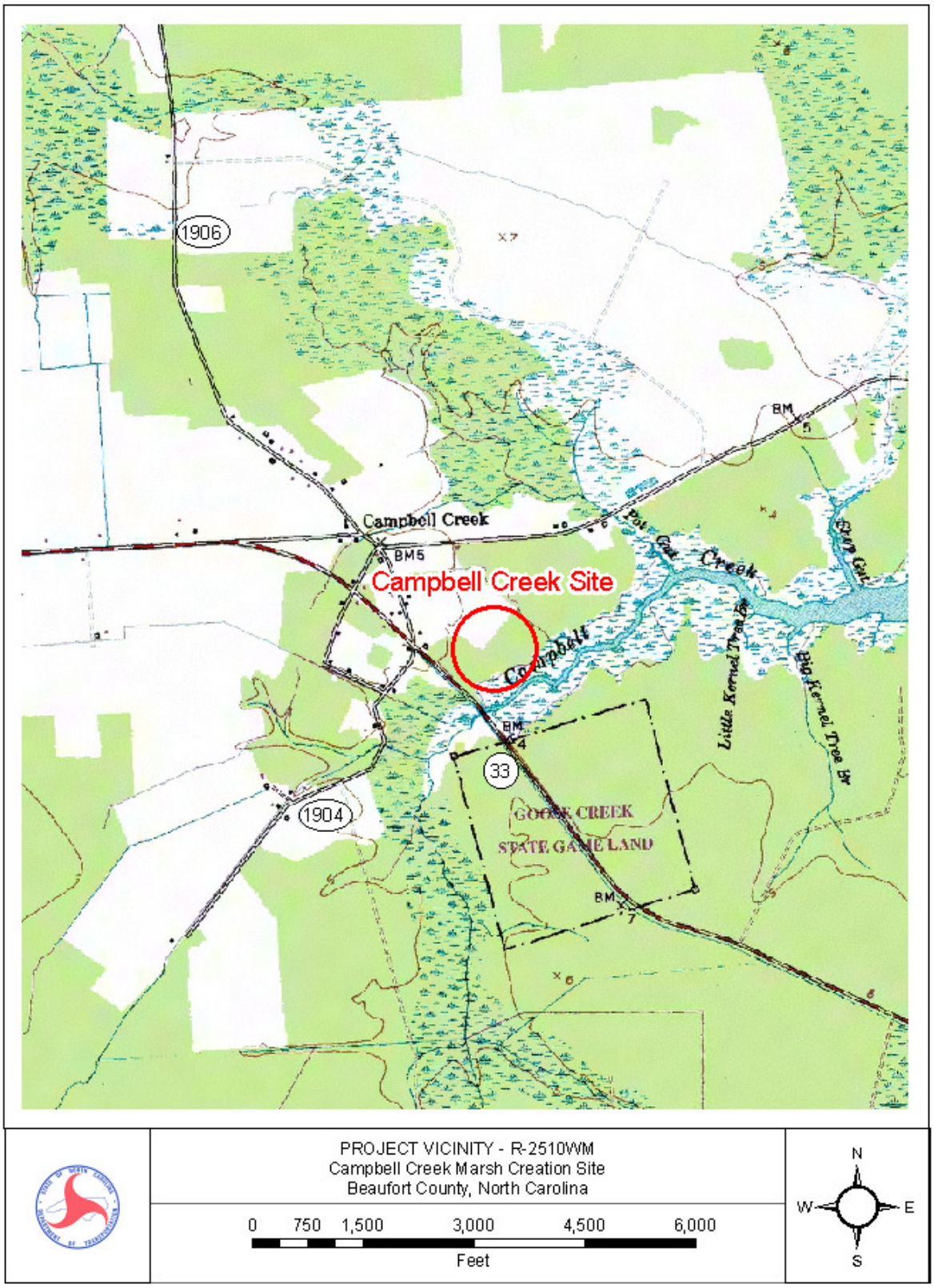


Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

The hydrologic success criteria established for the Campbell Creek Phase I Mitigation Site, as stipulated in the approved mitigation plan and subsequent revisions, require that the site demonstrate frequent periods of inundation. The surface water gauges will then be compared to the reference gauges to show that the inundation patterns are similar. Groundwater monitoring is not required at this site since it is a wind driven tidal system.

2.2 Hydrologic Description

Wind-driven tides are the primary hydrologic input at the Campbell Creek Phase I Mitigation Site. Four surface water monitoring gauges were installed within the Phase I site restoration area (CC-SG1, CC-SG2, CC-SG3, CC-SG4; see Figure 2) in July 2006. There is also one reference gauge (CC-REF1) located directly adjacent to the constructed site, within the preservation area. The surface gauges record surface water levels every three hours on a daily basis. Monitoring data for 2009 represents the fourth year of hydrologic monitoring for the Phase I site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

Appendix A contains plots of the data at each surface gauge location. The set of plots shows the surface water elevation recorded against the actual gauge elevation surveyed relative to mean sea level. All four of the surface gauges as well as the reference gauge show that the site is demonstrating frequent periods of inundation.

2.3.2 Climatic Data

Precipitation is not the primary hydrologic input for this site and was not included in this report. It is expected that the site would show the required periods of inundation regardless of area rainfall totals.

2.4 Conclusions

The 2009-year represents the fourth year of hydrologic monitoring for the Campbell Creek Phase I mitigation site. The four surface water gauges were compared to the one reference gauge. The four surface water monitoring gauges showed periods of inundation similar to that of the reference gauge during the 2009 monitoring year.

NCDOT will continue to monitor the Campbell Creek Phase I Mitigation Site for hydrology in 2010.

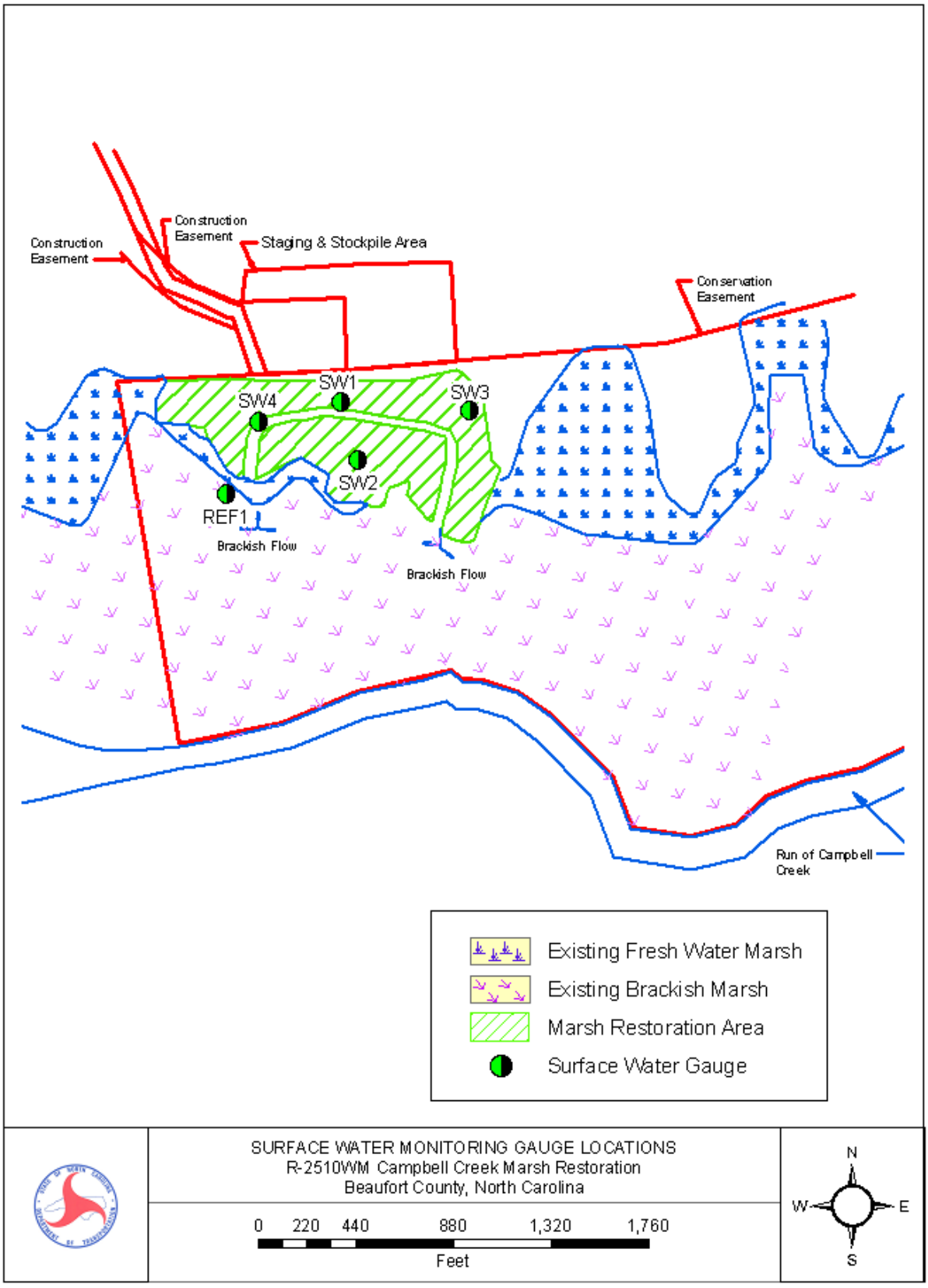


Figure 2. Monitoring Gauge Location Map (Phase I Site)

3.0 VEGETATION: CAMPBELL CREEK PHASE I SOUTH SIDE (YEAR 4 MONITORING)

3.1 Success Criteria

The vegetative marsh success of the wetland site will be determined in accordance with NMFS Guidelines. Monitoring plots found to be located within the open water channel will not be evaluated, and will not count toward the final count of plots. The vegetation component of the wetland site will be deemed successful if the following criteria are met:

1. At year five, the average of all plots should have a scale value of 5 (>75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species.
2. A minimum of 70% of the plots shall contain the target (planted) species.

3.2 Description of Species

The following marsh grass species were planted in the Wetland Restoration Area:

Cladium jamaicense, Sawgrass

Juncus roemerianus, Black Needle Rush

3.3 Results of Vegetation Monitoring

Table 1. Vegetation Monitoring Results (Marsh Area)

Plot #	Scale Factor	*Cladium jamaicense*	*Juncus roemerianus*	Frequency	Comments
1	5.0		⊗	⊗	
2	5.0		⊗	⊗	
3	5.0	⊗		⊗	
4	5.0		⊗	⊗	
5	0.0				No Vegetation, 1" of Surface Water
6	5.0		⊗	⊗	
7	5.0		⊗	⊗	
8	5.0		⊗	⊗	
9	5.0		⊗	⊗	
10	5.0		⊗	⊗	
11					Open Water
12	5.0		⊗	⊗	
13	5.0	⊗	⊗	⊗	
14	5.0		⊗	⊗	
15	4.0	⊗		⊗	
16	5.0	⊗	⊗	⊗	*Aster* sp.
17	3.0		⊗	⊗	
18	5.0		⊗	⊗	
19	5.0	⊗	⊗	⊗	
20	5.0		⊗	⊗	
21	5.0		⊗	⊗	
22	2.0		⊗	⊗	*Scirpus* sp.
23	4.0	⊗	⊗	⊗	*Aster* sp.
24	5.0		⊗	⊗	
25	5.0		⊗	⊗	
26	5.0		⊗	⊗	
27	5.0		⊗	⊗	
28	5.0		⊗	⊗	
29	5.0		⊗	⊗	
30	5.0	⊗	⊗	⊗	
Frequency (Percentage of Plots with Desired Species)				97.0%	
Sum Scale Value				133.0	
Total Number of Plots				29	
Vegetative Cover (Scale Value)				4.8	

Site Notes: The number of plots the species were found in is listed in parentheses (i.e. 2 of the plots contain *Aster* sp.) *Aster* sp. (2), *Scirpus* sp. (1). There no areas of phragmites noted during the 2009 monitoring evaluation.

3.4 Conclusions

Percent Frequency of Target Species **97.0 %**
Frequency of 70% required.

Vegetative Cover Scale Value **4.8**
Scale Value of 5 required for year 5.

Campbell Creek (Phase I – South Side) was originally planted in June 2006. The site was supplementally planted in May 2007 to increase the planting coverage on site. The planted vegetation is surviving and spreading throughout the site. NCDOT proposes to continue vegetation monitoring at the Campbell Creek (Phase I – South Side) Mitigation Site for 2010.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2009-year represents the fourth year of hydrologic monitoring for the Campbell Creek Phase I Site. The four surfaced water gauges were compared to the one reference gauge. The surface water monitoring gauges showed periods of inundation similar to that of the reference gauge during the 2009 monitoring year.

For the vegetation monitoring in the marsh grass area, the target species and scale values were 97.0% and 4.8, respectively. The planted vegetation is surviving and spreading throughout the site. NCDOT proposes to continue vegetation monitoring at the Campbell Creek Phase I Side Mitigation Site.

NCDOT proposes to continue vegetation and hydrologic monitoring at the Campbell Creek Phase I Mitigation Site in 2010.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

PHOTO AND VEGETATION PLOT LOCATIONS, SITE PHOTOS

Campbell Creek Phase I - South Side


Photo 1


Photo 2

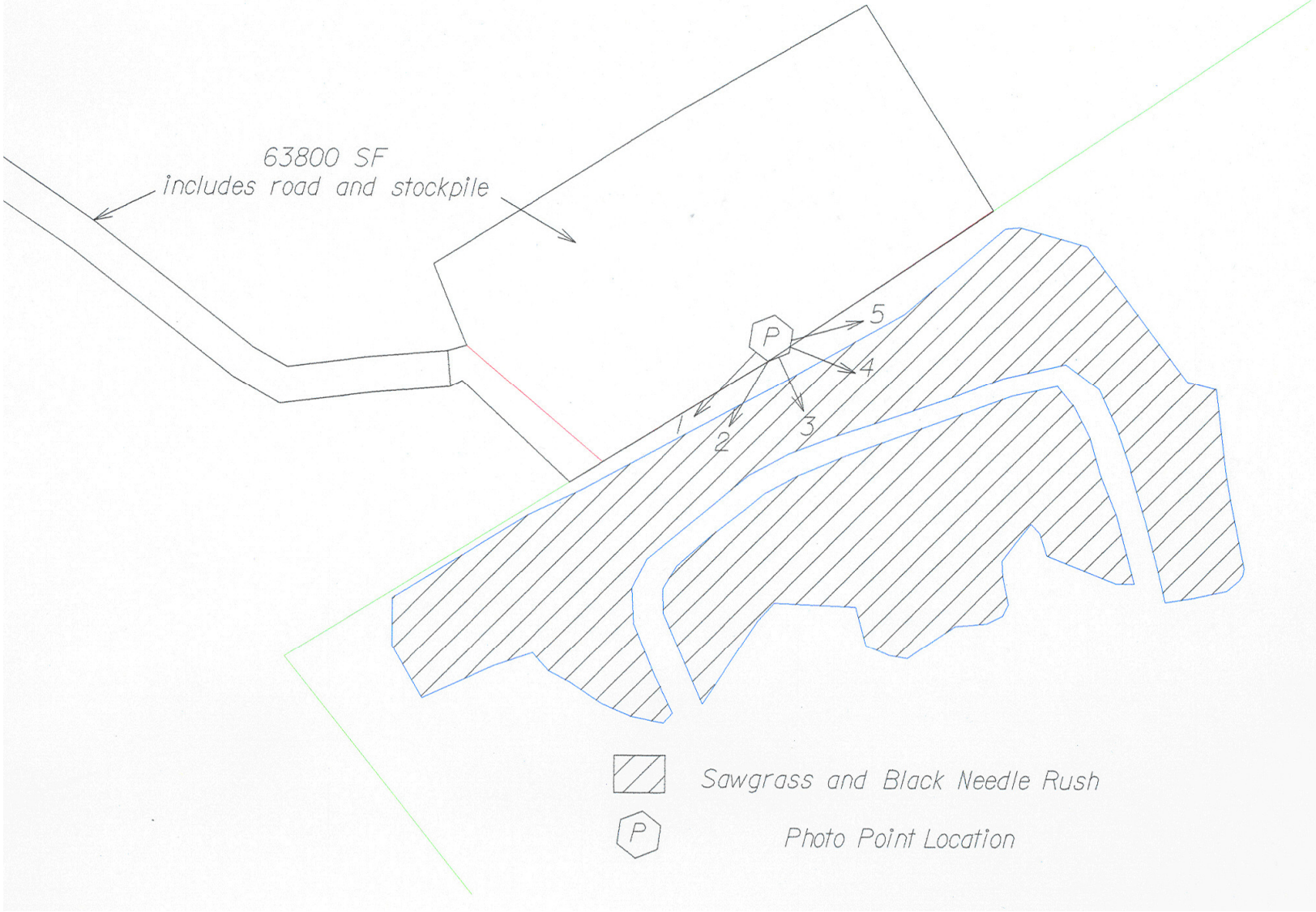

Photo 3


Photo 4


Photo 5

August 2009

Campbell Creek Phase I (South Side)
Planting Plan and Photo Point Location



Campbell Creek (Phase I – South Side)
2009 Marsh Grass Random Points